SHARP Service Manual

Solid State 2-Band Portable Radio

MODEL FX-209AU

SPECIFICATIONS

Frequency Range	
MW	520 ~ 1620 kHz
AIR	108 ~ 136 MHz
Intermediate Frequency	
MW	455 kHz
AIR	10.7 MHz
Power Output	
Undistorted	200 mW
Maximum	350 mW
Speaker	6 cm Permanent Dynamic Speaker 8 ohm
Power Source	DC6V (UM-3 battery x 4)
Dimensions	128(H) x 75(W) x 35(D) mm
Weight	265 g (Without batteries)

GENERAL DESCRIPTION

The circuitry used in this 2-band (MW/AIR) superheterodyne system portable radio incorporates 8 transistors and 2 diodes. A ferrite bar antenna feeds the MW broadcasting signal to the MW converter (Q2), 2 IF amplifiers (Q3 and Q4) and a diode detector (D2).

A telescopic rod antenna feeds the FM broadcasting to the AIR RF amplifier (Q1), AIR converter (Q2), 2 IF amplifiers (Q3 and Q4) and a diode detector (D2).

The audio signal passes through the 4 transistors (Q5 ~ Q8) audio amplifier circuit.

An MW AVC voltage is fed back to the 1st IF amplifier. An AIR AVC voltage is fed back to the RF amplifier and the 1st IF amplifier.

SHARP CORPORATION OSAKA, JAPAN

ALIGNMENT INSTRUCTIONS

Should it become necessary at any time to check the alignment of this receiver, proceed as follows;

1) Connect an output meter across the speaker voice coil lugs.
2) Set the volume control for maximum.
3) Attenuate the signals from the generator enough to swing the most sensitive range of the output meter.
4) Use a non-metallic alignment tool.
5) Repeat adjustments to insure good results.

MW ALIGNMENT CHART

Set the Band Selector Swtich at "MW" position.

STEP	TEST STAGE	SIGNAL GENERATOR		RECEIVER		ADJUSTMENT
		CONNECTION TO RECEIVER	INPUT SIGNAL FREQUENCY	DIAL SETTING	REMARKS	
1	IF	Connect signal generator through a 10K ohm dummy to the antenna tuning capacitor. Ground lead to the receiver chassis.	Exactly 455kHz (400Hz, 30%, AM modulated)	High end of dial (minimum capacity)	Adjust for maximum output on speaker voice coil lugs.	T4 T5 T6
2	Band Coverage	Use radiation loop. Loop of several turns of wire, or place generator lead close to receiver for adequate signal pickup. Connect generator output to one end of this wire.	Exactly 510kHz (400Hz, 30%, AM modulated)	Low end of dial (maximum capacity)	Same as step 1	Adjust the MW oscillator coil L6.
3		Same as step 2.	Exactly 1650kHz (400Hz, 30%, AM modulated)	High end of dial (mininum capacity)	Same as step 1	Adjust the MW oscillator trimmer C8
4	Tracking	Same as step 2.	Exactly 600kHz (400Hz, 30%, AM modulated)	600kHz	Same as step 1	Adjust the MW antenna coil L5. (See NOTE A)
5		Same as step 2.	Exactly 1400 kHz (400Hz, 30%, AM modulated)	1400kHz	Same as step 1	Adjust the MW antenna trimmer C7. (See NOTE A)
6	Repeat steps 2, 3, 4 and 5 until no further improvement can be made.					

NOTE A

Check the alignment of the receiver antenna coil by bringing a piece of ferrite (such as a coil slug) near the antenna loop stick, then a piece of brass. If ferrite increases output, loop requires more inductance. If brass increases output, loop requires less inductance. Change loop inductance by sliding the bobbin toward the center of ferrite core to increase inductance, or away to decrease inductance.

AIR ALIGNMENT CHART

Set the Band Selector switch at "AIR" position.

STEP	TEST STAGE	SIGNAL GENERATOR		RECEIVER		ADJUSTMENT
		CONNECTION TO RECEIVER	INPUT SIGNAL FRE QUENCY	DIAL SETTING	REMARKS	
1	IF	Connect signal generator through a 5PF capacitor to test point [TP-3] . Connect generator ground lead to the receiver chassis.	Exactly 10.7MHz (400Hz, 30% AM modulated)	High end of dial (minimum capacity)	Connect VTVM between test point [TP-5] and chassis ground.	T1 T2 T 3 Adjust for maximum output.
2	Band Coverage	Connect signal generator through a dummy, including output impedance of signal generator to the rod antenna (Refer to figure 1). Ground lead of generator connected to the receiver chassis.	Exactly 107MHz (400Hz, 30% AM modulated)	Low end of dial (maximum capacity)	Adjust for maximum output speaker voice coil lugs.	Adjust the AIR oscillator coil L4-a and L4-b.
3		Same as step 2.	Exactly 138MHz (400Hz, 30%, AM modulated)	High end of dial (minimum capacity)	Same as step 2.	Adjust the AIR oscillator trimmer C6.
4	Tracking	Same as step 2.	Exactly 108MHz (400Hz, 30%, AM modulated)	108MHz	Same as step 2.	Adjust the AIR RF coil L2-a and L2-b.
5		Same as step 2.	Exactly 136MHz (400Hz, 30%, AM modulated)	136MHz	Same as step 2.	Adjust the AIR RF trimmer C5.
6	Repeat steps 2, 3, 4 and 5 until no further improvement can be made.					

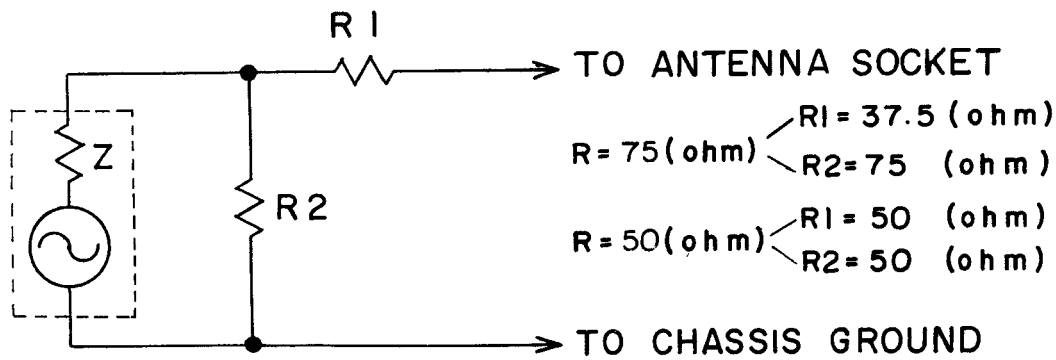

Figure 1 FM DUMMY

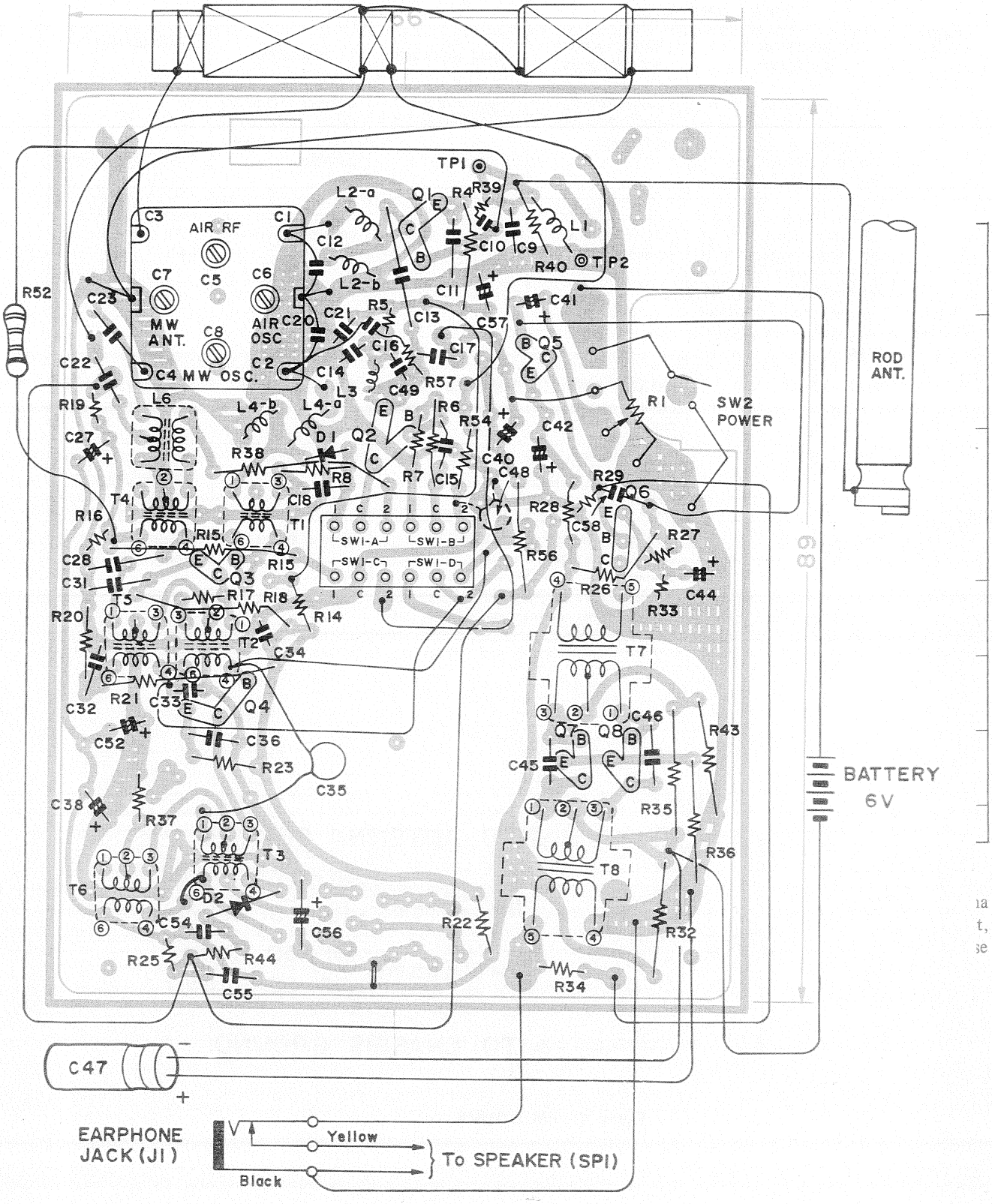

Figure 2 WIRING SIDE OF P.W. BOARD

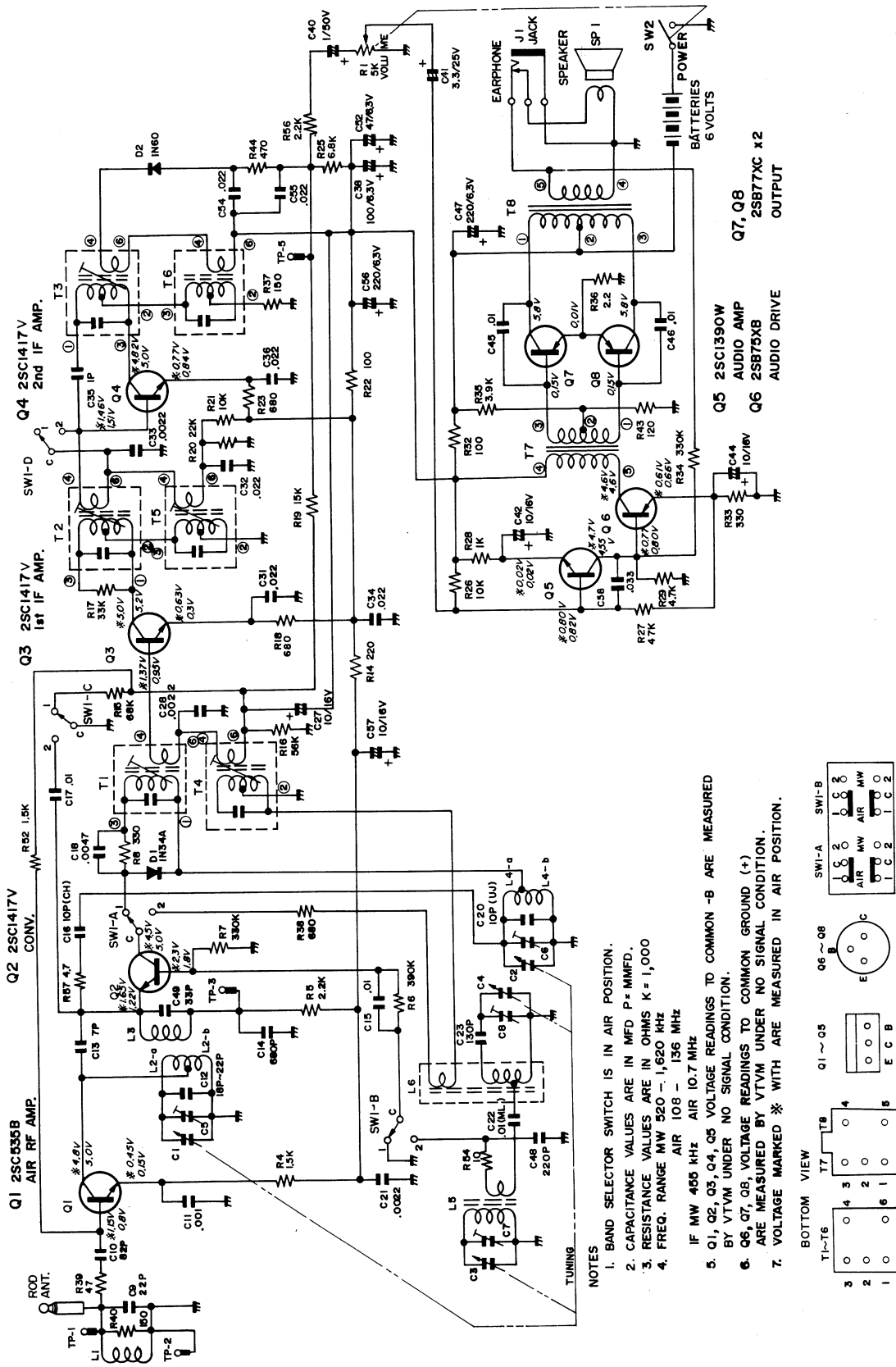

Figure 3 SCHEMATIC DIAGRAM

(Specifications or wiring diagrams of this model are subject to change for the improvement without prior notice)

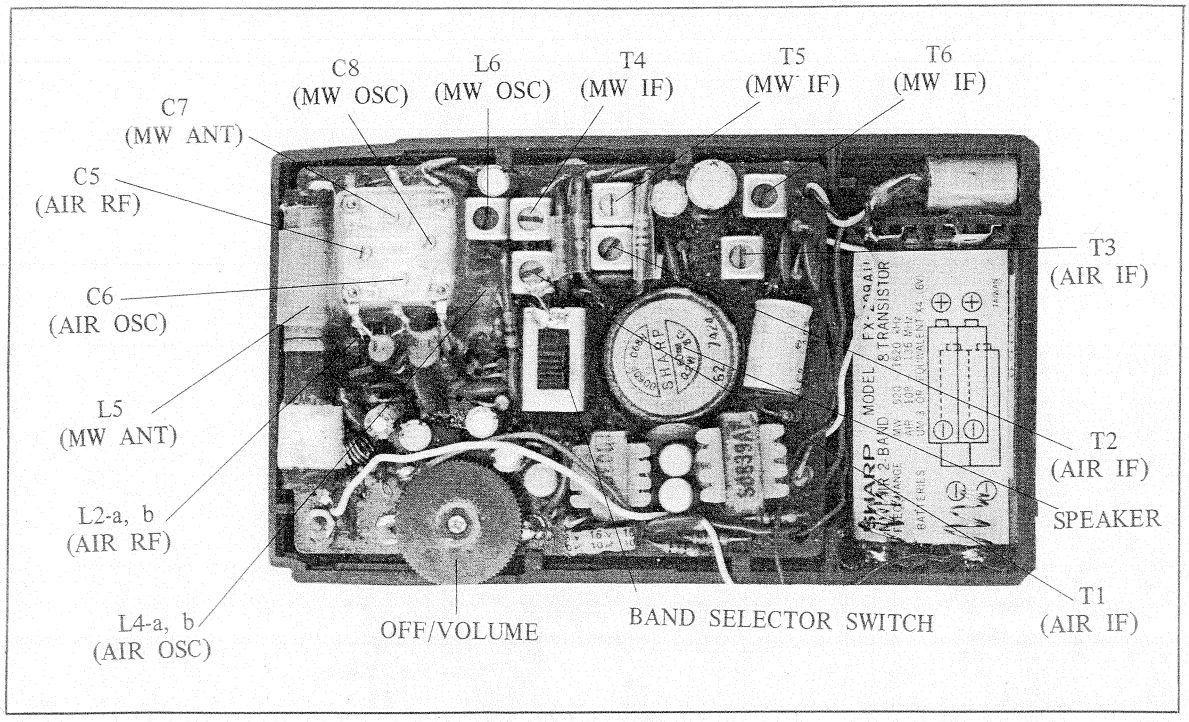

Figure 4 ALIGNMENT POINTS

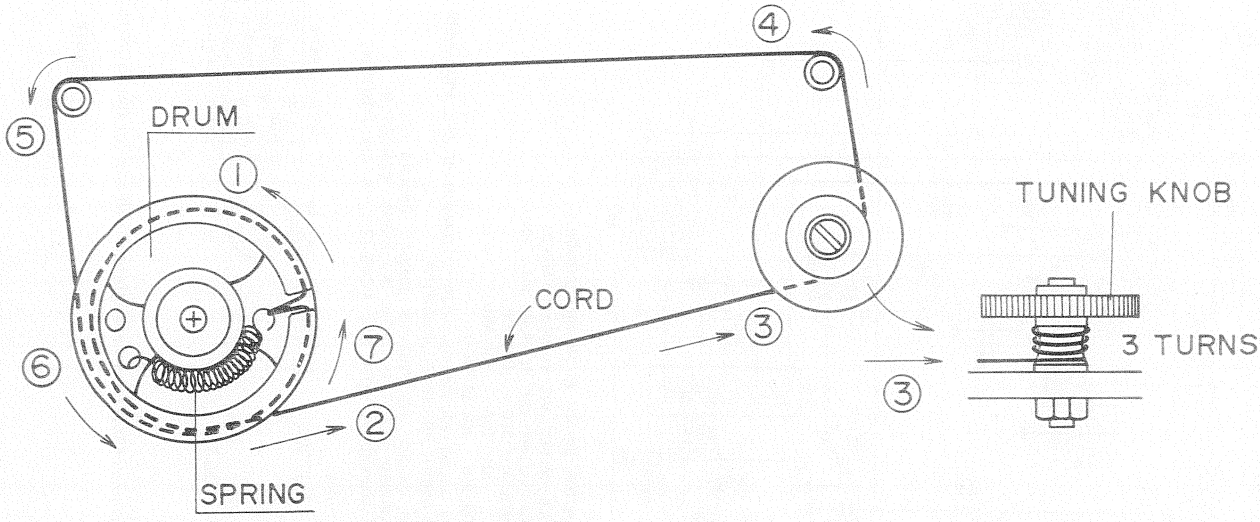

Figure 5 DIAL CORD STRINGING

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

REF NO.	PART NO.	DESCRIPTION	CODE
TRANSISTORS			
Q1	VS2SC535-B/-1	AIR RF Amplifier	
Q2	VS2SC1417-V-1	Converter	
Q3	VS2SC1417-V-1	1st IF Amplifier	
Q4	VS2SC1417-V-1	2nd IF Amplifier	
Q5	VS2SC1390-W-1	Audio Amplifier	
Q6	VS2SB75X-B/1F	Audio Driver	
Q7,Q8	VS2SB77X-CP1F	Audio Output	
DIODES			
D1	VHD1N34A///-1	AIR Overload	
D2	VHD1N60////-1	Detector	
COILS			
L1	RCILR0127AFZZ	AIR Antenna	
L2-a	RCILR0118AFZZ	AIR RF	
L2-b	RCILR0096AFZZ	AIR RF	
L3	RCILC0018AFZZ	AIR Emitter Choke	
L4-a	RCILB0360AFZZ	AIR Oscillation	
L4-b	RCILB0360AFZZ	AIR Oscillation	
L5	RCILA0193AFLA	MW Antenna	
L6	RCILB0269AFZZ	MW Oscillation	
TRANSFORMERS			
T1	RCILI0142AFZZ	1st AIR IF	
T2	RCILI0150AFZZ	2nd AIR IF	
T3	RCILI0085AFZZ	3rd AIR IF	
T4	RCILI0141AFZZ	1st MW IF	
T5	RCILI0148AFZZ	2nd MW IF	
T6	RCILI0149AFZZ	3rd MW IF	
T7	RTRNI0030AFZZ	Driver (Input)	
T8	RTRNS0839AFZZ	Output	
CAPACITORS (Unless otherwise specified capacitors are 50V, +80 −20%, Ceramic Type)			
C1, C2, C3, C4, C5, C6, C7, C8	RVC-R0014AFZZ	Variable Capacitor, Tuning with Trimmers C5 : AIR RF Trimmer C6 : AIR Oscillator Trimmer C7 : MW Antenna Trimmer C8 : MW Oscillator Trimmer	

REF. NO.	PART NO.	DESCRIPTION	CODE
C9	VCCSPU1HL220J	22PF, 50V, ±5%, Ceramic	
C10	VCCSPU1HL820J	82PF, 50V, ±5%, Ceramic	
C11	VCKZPU1HF102Z	.001MFD	
C12	VCCSPU1HL180J	18PF, 50V, ±5%, Ceramic	
C13	VCCSPU1HL7R0D	7PF, 50V, ±0.5PF, Ceramic	
C14	VCKZPU2HB681K	680PF, 500V, ±10%, Ceramic	
C15	VCKZPU1HB103M	.01MFD, 50V, ±20%, Ceramic	
C16	VCCCPU1HH100F	10PF, 50V, ±1PF, Ceramic	
C17	VCKZPU1HB103M	.01MFD, 50V, ±20%, Ceramic	
C18	VCKZPU1HF472Z	.0047MFD	
C20	VCCUPU1HJ100K	10PF, 50V, ±10%, Ceramic	
C21	VCKZPU1HF222Z	.0022MFD	
C22	VCQYKU1HM103M	.01MFD, 50V, ±20%, Mylar	
C23	VCCSBU1HL131J	130PF, 50V, ±5%, Ceramic	
C28	VCKZPU1HF222Z	.0022MFD	
C31	VCKZPU1HF223Z	.022MFD	
C32	VCKZPU1HF223Z	.022MFD	
C33	VCKZPU1HF222Z	.0022MFD	
C34	VCKZPU1HF223Z	.022MFD	
C35	VCCSPU1HL1R0C	1PF, 50V, ±0.25PF, Ceramic	
C36	VCKZPU1HF223Z	.022MFD	
C45	VCKZPU1HB103M	.01MFD, 50V, ±20%, Ceramic	
C46	VCKZPU1HB103M	.01MFD, 50V, ±20%, Ceramic	
C48	VCCSBU1HL221J	220PF, 50V, ±5%, Ceramic	
C49	VCCSPU1HL330J	33PF, 50V, ±5%, Ceramic	
C54	VCKZPU1HF223Z	.022MFD	
C55	VCKZPU1HF223Z	.022MFD	
C58	VCKZPU1HF333P	.033MFD, 50V, +100 −0%, Ceramic	
ELECTROLYTIC CAPACITORS			
C27	VCEAAU1CW106Q	10MFD, 16V, +100 −10%	
C38	VCEAAU0XW107Q	100MFD, 6.3V, +100 −10%	
C40	VCEAAU1HW105R	1MFD, 50V, +150 −10%	
C41	VCEAAU1EW335R	3.3MFD, 25V, +150 −10%	
C42	VCEAAU1CW106Q	10MFD, 16V, +100 −10%	
C44	VCEAAU1CW106Q	10MFD, 16V, +100 −10%	
C47	VCEAAU0XW227Q	220MFD, 6.3V, +100 −10%	
C52	VCEAAU0XW476Q	47MFD, 6.3V, +100 −10%	
C56	VCEAAU0XW227Q	220MFD, 6.3V, +100 −10%	
C57	VCEAAU1CW106Q	10MFD, 16V, +100 −10%	
RESISTORS (Unless otherwise specified resistors are 1/8W, ±10%, Carbon Type.)			
R1/SW2	RVR-D0089AFZZ	5K ohm, Volume with Power Switch	
R4	VRD-SU2BY152K	1.5K ohm	
R5	VRD-ST2BY222K	2.2K ohm	
R6	VRD-SU2BY394K	390K ohm	
R7	VRD-SU2BY334K	330K ohm	
R8	VRD-SU2BY331K	330 ohm	
R14	VRD-SU2BY221K	220 ohm	
R15	VRD-ST2BY683K	68K ohm	

MODEL
FX-209AU

SHARP

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
R16	VRD-SU2BY563K	56K ohm	
R17	VRD-SU2BY333K	33K ohm	
R18	VRD-ST2BY680K	680 ohm	
R19	VRD-SU2BY153K	15K ohm	
R20	VRD-SU2BY223K	22K ohm	
R21	VRD-ST2BY103K	10K ohm	
R22	VRD-SU2BY101K	100 ohm	
R23	VRD-SU2BY681K	680 ohm	
R25	VRD-SU2BY682K	6.8K ohm	
R26	VRD-ST2BY103K	10K ohm	
R27	VRD-SU2BY473K	47K ohm	
R28	VRD-SU2BY102K	1K ohm	
R29	VRD-SU2BY472K	4.7K ohm	
R32	VRD-ST2BY101K	100 ohm	
R33	VRD-SU2BY331K	330 ohm	
R34	VRD-SU2BY334K	330K ohm	
R35	VRD-ST2BY392K	3.9K ohm	
R36	VRD-ST2BY2R2K	2.2 ohm	
R37	VRD-SU2BY151K	150 ohm	
R38	VRD-ST2BY681K	680 ohm	
R39	VRD-ST2BY470K	47 ohm	
R40	VRD-ST2BY151K	150 ohm	
R43	VRD-ST2BY121K	120 ohm	
R44	VRD-SU2BY471K	470 ohm	
R52	VRD-ST2BY152K	1.5K ohm	
R54	VRD-SU2BY100K	10 ohm	
R56	VRD-ST2BY222K	2.2K ohm	
R57	VRD-ST2BY4R7K	4.7 ohm	

REF. NO.	PART NO.	DESCRIPTION	CODE

MISCELLANEOUS

	RPHOE0021AFZZ	Earphone	
	QPWBF0213AFZZ	P.W. Board	
J1	QJAKA0025AGS	Jack, Earphone	
SW1	QSW-S0052AF ZZ	Switch, Band Selector	
	PFLT-0075AF00	Felt, Band Selector Switch	
SP1	VSP0060P-068H	Speaker	
	QANTR0016AFFC	Antenna, Telescopic Rod	
	PFLT-0188AF00	Felt, Speaker	
	LX-NZ0025AFJ1	Nut, Earphone Jack	
	PSPAZ0035AFZZ	Spacer, Tuning Knob	
	GCABA0369AFS	Cabinet, Front	
	GCABB0370AFS	Cabinet, Back	
	JKNBN0021AFS	Knob, Tuning	
	JKNBK0114AFS	Knob, OFF/Volume	
	GCASK0061AFS	Case, Earphone	
	UBNDT0003AFS	Belt, Carrying	
	GFTAB1089AFS	Cover, Battery	
	NDRM-0070AFZZ	Drum, Dial Cord	
	FITT2000-AF01	Dial Cord	
	HSSND0084AFS	Pointer, Dial	
	HDALM0150AFS	Dial Scale	
	HINDM0621AFS	Indication Plate, "SOLID STATE"	
	HINDM0967AFS	Indication Plate, Band Selector	
	HDECA0252AFS	Metal, Decoration, Front Cabinet	
	LANGS0028AFFD	Bracket, Speaker	
	MSPRC0067AFFN	Spring, Battery (–)	
	MSPRT0007AFFW	Spring, Dial Cord	
	QTANB9071AFFN	Terminal, Battery (+)	

A2509-1MNK
Printed in Japan